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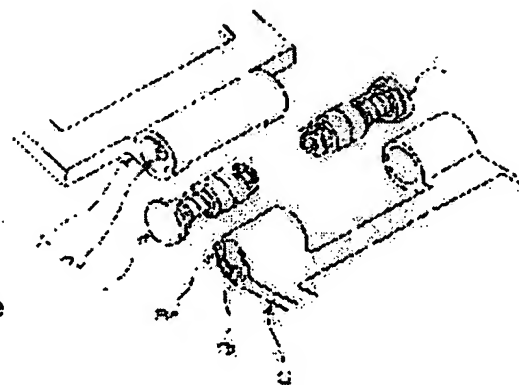
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(54) CYLINDRICAL HINGE

(57)Abstract:

PROBLEM TO BE SOLVED: To provide a hinge used for opening/closing of a display or the like in a portable device, in which a harness can be inserted inside for achieving a smaller diameter, in which it can be rotated by a switch or remote control for changing the angles of the display by remote control, and in which the root of the display moves forward as it is opened, even if the angle opened is almost 180°.

SOLUTION: A shaft member is provided with a rotation-stopping function to an enclosing cylinder and a cam to generate clicks, and the hinge is composed of three elements of shaft, spring and cylinder for achieving a smaller radius. The hinge is cylindrical and hollow for the harness to be inserted, and the enclosing cylinder is used as a casing, so that the whole display can be small in weight. For remote control to the hinge, a motor is provided inside the hinge, and a gear part is provided in an inner cylinder achieving a shaft function of the hinge, so that the inner cylinder is rotated. For forward movement of the display, a gear part is provided in a hinge outer cylinder supporting the root of the display, and a rack part is provided inside the body, so that they are engaged with each other via a step-up gear or the like. The hinge is thus moved, as the display is opened.



LEGAL STATUS

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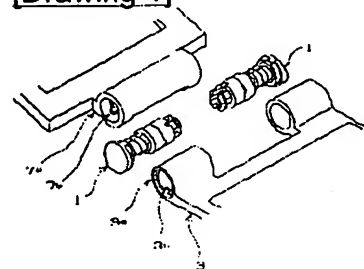
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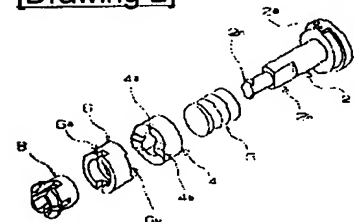
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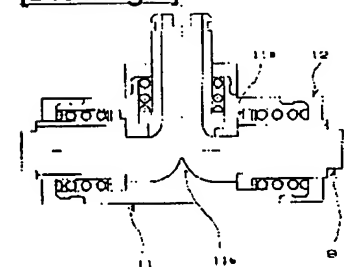
[Drawing 1]



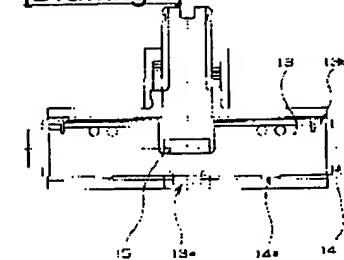
[Drawing 2]



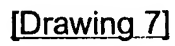
[Drawing 3]



[Drawing 4]



[Drawing 5]



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CLAIMS

[Claim(s)]

[Claim 1] The first cam with the trapezoid projection which was movable to shaft orientations, and niting was carried out to them to shaft-like part material in objects opened and closed, such as a lid, a door, and a display, and was oppressed by means of a spring is inserted in. The second cam member with the trapezoid crevice which faced the cam is the object of a configuration of being inserted in the apical-process section of shaft-like part material through a conclusion member. It has the part inserted in the stop section of the tubed part of either a body or a closing motion object in shaft-like part material, and a body or a closing motion object is the hinge of the structure where have the part inserted in the stop section of another tubed part, and a conclusion member is inserted in the hole, either in the second cam member.

[Claim 2] It is the hinge constituted by oppressing the telescopic shaft-like part material which has the cam section of a hinge which has the cam section of trapezoidal shape inside while a wrap cylinder constitutes a T character mold configuration for a periphery in general, and faced the cam in the object with which the above is opened and closed by means of a spring so that the telescopic conclusion member inserted in said T character type cylinder might press down the spring.

[Claim 3] It is the hinge with which the circular flat spring which has the slit section in cylinder inner circumference is forced with elasticity about the rolling friction of vertical closing motion in the hinge of the becoming T character mold configuration cylinder, frictional force is generated, and a long plate is inserted in the slit section of the flat spring and which was constituted like like claim 2.

[Claim 4] The hinge made to carry out level rotation of a level rotation member, a closing motion rotation member, or its indicating equipment with which the gear section is prepared for boiling both, and rotation of a motor side was made to be transmitted to the gear section with a switch or remote control in the hinge of the T character mold configuration cylinder which becomes like claim 2-3.

[Claim 5] The hinge which prepared the gear section in horizontal cylinder both ends, and closing motion of a hinge is transmitted to the rack prepared in the body, and moved forward and backward along with closing motion through the middle gear, the step up gear, etc. in the telescopic hinge to which closing motion friction was given if needed.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[The technical field to which invention belongs] This hinge is used in closing motion of displays, such as a personal computer of a thin display, and television, a cellular phone, a personal digital assistant, video camera digital camera karaoke, as an object which offers the function accompanied also by not only opening and closing but level rotation / vertical rotation as what functions in a small tooth space, or the migration to order.

[0002]

[Description of the Prior Art] As basic structure of a hinge, it is constituted using the cam in which registration JP,2526490,B has trapezoid concave and convex, and it consists of cams in which an application for patent No. 338412 [2000 to] has trapezoid concave and convex similarly, and applies for the object which takes out the feeling of a click at the time of closing motion. On the thin display, only the hinge leaned forward and backward was used to the base to support.

[0003]

[Problem(s) to be Solved by the Invention] Since it had become the structure of sliding on shaft orientations while one cam also has the slot of the niting to a body cylinder part in registration JP,2526490,B and the cam and the body cylinder part received turning effort, the combination of the quality of the material of a body cylinder part and a cam receives constraint from the point of wear, or it becomes four components of a cylinder, a cam, a spring, and a shaft radial, and was hard to make it small. In the application for patent No. 338412 [2000 to], the reaction force of the spring for taking out a feeling of a click has structure concerning a body cylinder part, and the dimension of a body cylinder part received constraint from the side on the strength. on a thin display, it is used for arrangements, such as a case of a notebook computer, in many cases, and the whole personal computer must be turned to showing a partner a display -- it carries out and only opening and closing forward and backward with trouble cannot open about 180 degrees, either, and it will fall as lightweight-ization of a body will progress, supposing it opens.

[0004]

[Means for Solving the Problem] Although it was the same as usual to use a cam to give a feeling of a click, in claim 1, this application made the cam and the shaft the structure of sliding on shaft orientations, receiving turning effort, constituted them from three components of a cylinder, a spring, and a shaft in radial, and attained the minor diameter. Moreover, the function to receive the reaction force of a spring is given to the conclusion member to a cylinder, and it was made for there to be no constraint on the strength to a body in it. In addition to the closing motion direction, in claim 2-3, it was presupposed by carrying out the internal organs of the hinge function part to the cylinder of a T character mold that it is pivotable also to the longitudinal direction. Furthermore, the gear section which prepared the motor side in the shaft in preparation for a hinge is driven, and it enabled it to also perform remote operation in the rotation to a longitudinal direction. It was made for a hinge to move to the front at claim 5 by engagement with the rack which prepared the gear section in the closing motion shaft side of a hinge, and was prepared in the body as it opened.

[0005]

[Embodiment of the Invention] In claim 1, since the internal components of a hinge function are unifying, an assembly is possible only by stuffing it into a considering-as hinge of body or closing motion object cylinder part from shaft orientations, and it becomes the hinge united with the body case. The passage tooth space

of the harness which sheathing of a hinge is also making serve as the cylinder itself which constitutes a hinge function, and connects a display with claim 2-3-4 to a body at coincidence is also given. For the reason, what is necessary is just to attach a hinge, and it does not need to prepare the harness passage section separately. In claim 5, by including in a thin display or a notebook computer, even if it opens about 180 degrees, it is located to the front and a display is changed into the condition that a height location is also still low.

[0006]

[Example] The interior components of a hinge are shown in the whole hinge and drawing 2 which prepared the cylinder part in the body and the closing motion object about claim 1 at drawing 1. The shaft-like part material 2 which constitutes the interior coalesce article 1 of a hinge is equipped with heights 2a included in crevice 3b prepared in tubed part 3a of the body case 3, variant cross-section section 2b of the structure of sliding on shaft orientations while receiving turning effort from the migration cam 4, and apical-process section 2c. Variant cross-section section 2b of the shaft-like part material 2 let variant hole 4a pass, and the migration cam 4 has touched so that it may fit in, when the fixed cam 6, and each convex cam section 4b and concave cam section 6a carry out predetermined include-angle rotation in response to the elasticity of a spring 5. Even when opening, for example, two places are sufficient for 150 degrees concave cam section 6a, one place considers as the same magnitude as the convex cam section, and one more place can be extended to the width which can carry out right-and-left common use. The fixed cam 6 is inserted in height 7b which slot 6a prepared in tubed part 7a of the closing motion object case 7, and rotation immobilization is carried out to the closing motion object case 7. Resisting and pushing the fixed cam 6 on the elasticity of a spring 5, the conclusion member 8 turns, after passing apical-process section 2c of the shaft-like part material 2, and it is stopped in the crevice established in the base. Heights 2a of the shaft-like part material 2 is only stuffed into the cylinder part which the internal components of a hinge function are unified by the above and unified to the body case or the closing motion object case according to crevice 3b of the body case 3, and assembly is completed.

[0007] Drawing 34 to claim 2-3 is the sectional view of a hinge with both the functions of the closing motion which unifies a cylinder part and enabled it to let a harness pass, and level rotation. The container liner 9 which has the cam section like the above is pushed against horizontal cam section 11a of the T character type cylinder 11 with coiled spring 10, the reaction force of coiled spring 10 is received by the telescopic conclusion member 12 pressed fit in the T character type cylinder 11, and the closing motion rotation which has a click function consists of drawing 3. Level rotation also completely consists of same components, and serves as a hinge which combines both and has a click by closing motion and level rotation. Inside height 11b is guidance to which a harness is led to a right angle. In this case, a thing with damaging [little / there is little shape of toothing and] a harness also serves as an advantage at the harness passage section. In drawing 4, it has bending beforehand in the inner circumference of the T character type cylinder which has a hole in a rectangular section confrontation, and is inscribed in flat spring 13, and rotational frictional force is generated. A periphery edge hits the long plate 14 by which the diameter was carried out to right and left, the flat spring 13 stops height 14a of the long plate 14 to a hole, and the opposite side is rotated with the long plate 14. Moreover, the stop of the flat spring 13 is escaped from and carried out to a T character type cylinder by central tongue-shaped piece section 13a, both-ends tongue-shaped piece section 13b gets into the inner circumference crevice of a T character type cylinder, and a click function is demonstrated. Although level rotation is applicable also to drawing 3, a wave washer consists of container liners which have two or more cam sections in piles, for example. Since the diameter of the long plate 14 is carried out with the configuration of drawing 4, even if it has a hole in a rectangular section confrontation, it can prevent being inferior in reinforcement compared with the configuration of drawing 3, it is [a harness] through-easy and it is carried out, and after letting a harness pass, covering 15 closes a hole.

[0008] Drawing 5 to claim 4 is the device in which prepare level gear section 16a in the level rotation member 16 of the hinge device which consisted of claims 2.3, tell rotation of a motor side 17 to level gear section 16a through a moderation device, and the display as a closing motion object etc. is rotated. On the large-sized display incorporating this hinge shown in drawing 6, when seeing by many people, without being caught by the screen-display method, if a hinge is rotated with the switch from a distant place, or remote control depending on means of displaying, a thin display hard to see from slant can also offer a more legible screen, and becomes effective in a meeting or a lecture meeting. Moreover, if the internal gear section is prepared also in the container liner of the closing motion direction and rotation of a motor side is told to it

through planet-gear moderation etc., it can rotate by the switch from a distant place, or remote control actuation also to the upper and lower sides, karaoke is managed on one large-sized display, and a legible image can be enjoyed also in the condition of having slept, on television.

[0009] It is a device which moves to the front as the appearance which does not fall even if a body is lightweight-ized with a notebook computer etc. when about 180 degrees of displays are opened greatly for example, and the hinge which attached friction open drawing 78 to claim 5. The cylinder of the hinge closing motion direction the movement toward a display 18 For example, the middle gear 20 which forms the semicircle gear section 19 in both ends, and gears to it, Since it has geared with the step up gear 22 which gears also to rack section 21a with which the rear face of the body 21 which is a printer etc. was equipped If a display 18 is turned to the right, the surroundings and step-up-gear 22 self move to the left on the right with the bearing which unifies a hinge shaft, a middle gear shaft, and a step-up-gear shaft, and a step up gear 22 will also be in the condition of drawing 8 . Although it is possible to open bringing a display root close to the front even if it has the hinge which allotted two or more arms to the serial and attached friction to the joint as a device besides this, part weight with many [setting the hinge torque of each joint as the value which can carry out smooth actuation] difficult broth arms tends to become heavy. Moreover, while it can do thinly, height will become large, but if the thickness of the space depth direction makes the semicircle gear section 19 and the middle gear 20 the combination of a bevel gear and makes rack section 21a sideways when pressing down height low, it can consist of drawing 7 thinly.

[0010]

[Effect of the Invention] Although especially a small light thing is desired by the pocket device, if the niting to the cylinder which was described above and which carries out an enclosure to shaft-like part material, and the cam which issues a click is given like, in radial [as a hinge], it can constitute from three, a shaft, a spring, and a cylinder, and it will become possible in the thickness direction to make it thin. Furthermore, it is cylindrical, and since it serves also as sheathing in the hinge of the hinge rectangular cross mold to constitute, a notebook computer has effectiveness in weight mitigation, and it can be felt in design refreshed by giving the harness passage section to the hinge itself. Display rotation with the hinge equipped with the motor side can be operated having a document etc. in one hand, since rotation did not take both hands, and it can avoid hard to see [of the image from slant peculiar to a thin display] by carrying out level rotation. Moreover, several persons can gather in the shape of a circle, for example, facing up of the screen in a notebook computer, thin television, etc. can enjoy a game etc. on a screen small also in a vehicle, and since it will not fall if a display root moves to the front, the man of a confrontation can also see it on one person's knee.

[Translation done.]

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DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

- [Drawing 1]** The hinge which prepared the cylinder part in the body and the closing motion object
- [Drawing 2]** Interior part drawing of a hinge
- [Drawing 3]** The tubed hinge of closing motion and level rotation using coiled spring
- [Drawing 4]** The tubed hinge of closing motion and level rotation using flat spring
- [Drawing 5]** The tubed hinge of closing motion and level rotation using a motor side
- [Drawing 6]** Display general drawing incorporating the above-mentioned hinge
- [Drawing 7]** The organization chart which moves as a display opens
- [Drawing 8]** General drawing which opened about 180 degrees of above

[Description of Notations]

- 1 Interior Coalesce Article of Hinge
- 2 Shaft-like Part Material 2a Heights
- 2b Variant cross-section section 2c Apical-process section
- 3 Body Case 3a Tubed Part
- 3b Crevice
- 4 Migration Cam 4a Variant Hole
- 4b Convex cam section
- 5 Spring
- 6 Fixed Cam 6a Concave Cam Section
- 7 Closing Motion Object Case 7a Tubed Part
- 7b Height
- 8 Conclusion Member 9 Container Liner
- 10 Coiled Spring
- 11 T Character Type Cylinder 11a Horizontal Cam Section
- 11b Inside height
- 12 Telescopic Conclusion Member
- 13 Flat Spring 13a Central Tongue-shaped Piece Section
- 13b Both-ends tongue-shaped piece section
- 14 Long Plate 15 Covering
- 16 Level Rotation Member 16a Level Gear Section
- 17 Motor Side 18 Display
- 19 Semicircle Gear Section 20 Middle Gear
- 21 Body 21a Rack Section
- 22 Step Up Gear

[Translation done.]

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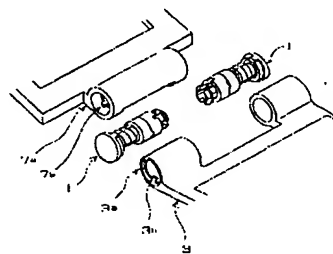
5K023 AA07 BB11 DD08 HH06 RR09

(54) 【発明の名称】 筒状ヒンジ

(57) 【要約】 (修正有)

【課題】 携帯機器の表示装置等の開閉に使用されるヒンジで、より小径化を狙い、ハーネスを内側に通せる。スイッチやリモコンで回転させられ、ディスプレイの角度を遠隔操作で変えられる。180°近く開けても、開けるにつれてディスプレイ根元が手前に移動する。

【解決手段】 軸状部材に外囲する筒とクリックを出すカムに対する回転止めを持たせ、ヒンジとしての半径方向には軸・ばね・筒の3つで構成し、半径方向に小さくした。ヒンジを筒状で内部を空洞としてハーネスを通せ、外囲する筒は外装として使って、表示装置全体として軽量化した。ヒンジの遠隔操作は、ヒンジ内にモーターを備えてヒンジの軸機能を果たす内筒にギヤ部を設けて、内筒を回す。ディスプレイの手前移動は、ディスプレイの根元を支持するヒンジ外筒にギヤ部を設け本体内部にラック部を設けて、増速ギヤ等を介して互いを噛み合わせ、ディスプレイを開けるにつれてヒンジが移動する。



【特許請求の範囲】

【請求項1】蓋・扉・表示装置等開閉される物において、軸状部材に対して、軸方向に移動可能で回転止めされ且つばねにて弾圧された台形突起を持つ第一カムが嵌め込まれ、そのカムに相対した台形凹部を持つ第二カム部材は軸状部材の先端突起部に締結部材を介して嵌め込まれる構成の物で、軸状部材には本体又は開閉体のいずれかの筒状部の係止部に嵌め込まれる部分を持ち、第二カム部材には本体又は開閉体のいずれかもう一方の筒状部の係止部に嵌め込まれる部分を持ち、締結部材はその穴部に嵌め込まれる構造のヒンジ。

【請求項2】上記の開閉される物において、ヒンジの概ね外周を覆う筒がT字型形状を成すと共に内部に台形状のカム部を有し、そのカムに相対したカム部を持つ筒型軸状部材がばねにて弾圧され、そのばねは前記T字型筒に嵌め込まれる筒型締結部材が押さえる様に構成した、ヒンジ。

【請求項3】請求項2の如くなるT字型形状筒のヒンジにおいて、上下開閉の回転摩擦については、筒内周にスリット部を持つ円形の板ばねが弾力を持って押し付けられて摩擦力を発生させ、その板ばねのスリット部に長尺の板材が嵌め込まれる様に構成された、ヒンジ。

【請求項4】請求項2・3の如くなるT字型形状筒のヒンジにおいて、水平回転部材や開閉回転部材又はその両方にギヤ部を設け、そのギヤ部にモーターの回転が伝達される様にした、表示装置をスイッチやリモコンにより水平回転させられるヒンジ。

【請求項5】開閉摩擦を付与された筒型のヒンジにおいて、水平方向の筒両端にギヤ部を設け、必要に応じて中間ギヤ・増速ギヤ等を介して、ヒンジの開閉が本体に設けられたラックに伝達され、開閉につれて前後に移動する様にした、ヒンジ。

【発明の詳細な説明】

【0001】

【発明が属する技術分野】このヒンジは、薄型ディスプレイのパソコンやテレビ・携帯電話・携帯型情報端末・ビデオカメラ・デジタルカメラ・カラオケ等の表示装置の開閉において、小さなスペースで機能するものとしてや、開閉するだけでなく水平回転・上下回転や前後への移動も伴う機能を提供する物として利用される。

【0002】

【従来の技術】ヒンジの基本構造としては、登録特許2526490号が台形の凹・凸を持つカムを用いて構成されており、特願2000-338412号も同様に台形の凹・凸を持つカムにて構成されており、開閉時のクリック感を出す物が出願されている。薄型ディスプレイでは、支持する台に対して前後に傾けるだけのヒンジが利用されていた。

【0003】

【発明が解決しようとする課題】登録特許252649

0号では一方のカムは本体筒部に対しての回転止めの溝も持っており、カムと本体筒部が回転力を受けながら軸方向に滑る構造となっているので、磨耗の点から本体筒部とカムの材質の組合せが制約を受けたり、半径方向に筒・カム・ばね・軸の4部品となり、小さくしにくかった。特願2000-338412号では、クリック感を出す為のばねの反力が本体筒部に掛かる構造となっており、強度面から本体筒部の寸法が制約を受けた。薄型ディスプレイでは、ノートパソコンの場合等打合せに用いられる事も多く、相手にディスプレイを見せるのにパソコン全体を回さねばならない面倒があったし、単に前後に開閉するのでも180°近くまでは開けられないし、開けるとすれば本体の軽量化が進むにつれて倒れてしまうこととなる。

【0004】

【課題を解決する為の手段】本願は、クリック感を付与するのにカムを使うのは従来と同様であるが、請求項1では、カムと軸を回転力を受けながら軸方向に滑る構造とし、半径方向に筒・ばね・軸の3部品で構成し小径を達成した。又、筒への締結部材にばねの反力を受ける機能を持たせ、本体への強度制約が無いようにした。請求項2・3では、T字型の筒にヒンジ機能部を内蔵させることによって、開閉方向に加えて左右方向へも回転可能とした。更に左右方向への回転では、ヒンジにモーターを備えて軸に設けたギヤ部を駆動し、遠隔操作でも行える様にした。請求項5では、ヒンジの開閉軸側にギヤ部を設け本体に設けられたラックとの噛み合いで、開けるにつれてヒンジが手前に移動する様にした。

【0005】

【発明の実施の形態】請求項1では、ヒンジ機能の内部部品が一体化しているので、それを本体又は開閉体のヒンジとしたの筒部に単に軸方向から押込むだけで組み立てが出来、本体ケースと一体化したヒンジとなる。請求項2・3・4では、ヒンジ機能を構成する筒そのものをヒンジの外装も兼ねるものとさせており、同時に本体とディスプレイを結ぶハーネスの通過スペースも持たせている。その為、ヒンジは取付けるだけで済み、ハーネス通過部を別途設けなくて済む。請求項5では、薄型ディスプレイやノートパソコンに組込むことにより、180°近く開いてもディスプレイを手前に位置させられるし、高さ位置も低いままの状態にさせられる。

【0006】

【実施例】請求項1について図1に本体・開閉体に筒部を設けたヒンジ全体、図2にヒンジ内部部品を示す。ヒンジ内部合体品1を構成する軸状部材2には、本体ケース3の筒状部3aに設けた凹部3bに入る凸部2aと、移動カム4から回転力を受けながら軸方向に滑る構造の異形断面部2bと、先端突起部2cとが備えられている。移動カム4は、異形穴部4aが軸状部材2の異形断面部2bに通され、ばね5の弾力を受けて固定カム6

と、それぞれの凸カム部4b・凹カム部6aが所定角度回転した時嵌まり込む様に接している。凹カム部6aは、例えば150°開く場合でも2箇所足り、1箇所は凸カム部と同じ大きさとし、もう1箇所は左右共用出来る巾に広げる事が可能である。固定カム6は、溝部6aが開閉体ケース7の筒状部7aに設けた突起部7bに差し込まれ、開閉体ケース7に対して回転固定される。締結部材8は、固定カム6をばね5の弾力に抗して押しながら、軸状部材2の先端突起部2cを通過させた後に回して、底面に設けた凹部に係止される。以上によりヒンジ機能の内部部品は一体化され、本体ケースや開閉体ケースに対して一体化されている筒部に、軸状部材2の凸部2aを本体ケース3の凹部3bに合わせて押し込むだけで、組立が完成される。

【0007】請求項2・3に対しての図3・4は、筒部を一体化しハーネスを通せる様にした開閉及び水平回転の両機能を持つヒンジの断面図である。図3では、前記と同様カム部を持つ内筒9がコイルばね10にてT字型筒11の横カム部11aに押し付けられ、コイルばね10の反力はT字型筒11に圧入される筒型締結部材12にて受けて、クリック機能を有する開閉回転が構成される。水平回転も全く同様の部品で構成され、両者を併せて開閉及び水平回転でクリックを持つヒンジとなる。内側突起部11bはハーネスを直角に導く案内である。この場合はハーネス通過部に凹凸形状が少なく、ハーネスを傷める事が少ないのも利点となる。図4では、直交部対面に穴部を持つT字型筒の内周に、予撓みを有して板ばね13が内接され、回転の摩擦力を発生する。その板ばね13は、左右に差し渡された長尺板14に、円周端部が当たりその反対側は穴部に長尺板14の突起部14aに係止して、長尺板14にて回転させられる。又、板ばね13は、中央舌片部13aでT字型筒に対して抜け止めされ、両端舌片部13bがT字型筒の内周凹部に嵌り込んで、クリック機能が発揮される。水平回転は、図3にも適用出来るが、例えばウエーブワッシャーを複数枚重ねてカム部を持つ内筒で構成される。図4の構成では長尺板14が差し渡されているので、直交部対面に穴部を持っても図3の構成に比べて強度的に劣るのを防ぐことが出来、ハーネスを通し易くしており、ハーネスを通した後にカバー15で穴部を塞ぐ。

【0008】請求項4に対する図5は、請求項2・3で構成されたヒンジ機構の水平回転部材16に水平ギヤ部16aを設け、モーター17の回転を減速機構を介して水平ギヤ部16aに伝えて、開閉体としてのディスプレイ等を回転させる機構である。図6に示す、このヒンジを組込んだ大型ディスプレイでは多くの人で見る場合、表示方式によっては斜めから見難い薄型ディスプレイでも、ヒンジを遠方からのスイッチやリモコンで回転させれば画面表示方式にとらわれる事無く、より見やすい画面を提供する事が出来、会議や講演会に有効となる。

又、開閉方向の内筒にもインターナルギヤ部を設け、モーターの回転を遊星ギヤ減速等を介して伝えれば、上下にも遠方からのスイッチやリモコン操作で回転出来、カラオケでは大型ディスプレイ1台で済ませられるし、テレビでは寝た状態でも見やすい映像を楽しめる。

【0009】請求項5に対する図7・8は、ディスプレイを180°近く大きく開いた場合に、例えばノートパソコン等で本体が軽量化されても倒れてしまう事が無い様、摩擦を付けたヒンジが開けるにつれて手前に移動する機構である。ディスプレイ18の動きは、ヒンジ開閉方向の筒の例えば両端に半円ギヤ部19を設け、それに噛み合う中間ギヤ20と、プリンター等である本体21の裏面に備えられたラック部21aにも噛み合う増速ギヤ22と噛み合っているため、ディスプレイ18を右へ回せば増速ギヤ22も右へ回り、増速ギヤ22自身はヒンジ軸・中間ギヤ軸・増速ギヤ軸を一体化する軸受と共に左へ移動し、図8の状態となる。機構としてはこれ以外にも複数のアームを直列に配し、その節点に摩擦を付けたヒンジを備えても、ディスプレイ根元を手前に近付けたまま開くことは可能であるが、各節点のヒンジトルクを円滑操作出来る値に設定するのが困難だしアームが多い分重量が重くなり易い。又、図7では紙面奥行き方向の厚みは薄く出来る反面、高さが大きくなってしまいが、高さを低く押さえる場合は半円ギヤ部19と中間ギヤ20をベベルギヤの組合せとし、ラック部21aを横向きとすれば薄く構成出来る。

【0010】

【発明の効果】携帯機器では小さく軽い事が特に望まれるが、以上述べた様に、軸状部材に外囲する筒とクリックを出すカムに対する回転止めを持たせれば、ヒンジとしての半径方向には軸・ばね・筒の3つで構成する事が出来、厚み方向に薄くする事が可能となる。更に、筒状で構成するヒンジ直交型のヒンジでは外装も兼ねるので、ノートパソコン等でも重量軽減に効果があるし、ハーネス通過部をヒンジ自身に持たせることにより、デザイン的にもすっきりさせ得る。モーターを備えたヒンジでのディスプレイ回転は、回転に両手を要しないので片手に書類等を持ったまま操作出来るし、水平回転させられる事により薄型ディスプレイ特有の斜めからの画像の見難さを回避できる。又、ノートパソコンや薄型テレビ等での画面の上向きは、数人が円陣状に集まって例えば乗り物の中でも小さな画面でゲーム等を楽しむ事が出来るし、ディスプレイ根元が手前に移動すれば倒れる事が無いので、一人の膝の上において対面の人も見る事が出来る。

【図面の簡単な説明】

【図1】本体・開閉体に筒部を設けたヒンジ

【図2】ヒンジ内部部品図

【図3】コイルばねを用いた開閉・水平回転の筒状ヒンジ

【図4】板ばねを用いた開閉・水平回転の筒状ヒンジ
 【図5】モーターを用いた開閉・水平回転の筒状ヒンジ
 【図6】上記ヒンジを組み込んだディスプレイ全体図
 【図7】ディスプレイが開けるにつれて移動する機構図
 【図8】上記を180°近く開いた全体図

【符号の説明】

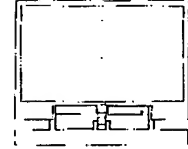
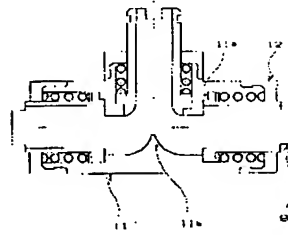
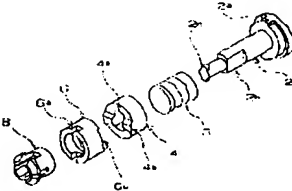
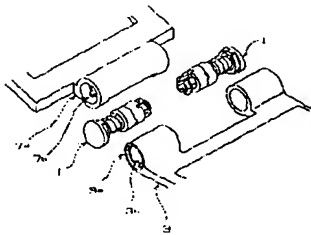
1	ヒンジ内部合体品			7 b	突起部		
2	軸状部材	2 a	凸部	8	締結部材	9	内筒
2 b	異形断面部	2 c	先端	10	コイルばね		
突起部				11	丁字型筒	11 a	横カ
3	本体ケース	3 a	筒状	ム部			
部				11 b	内側突起部		
3 b	凹部			12	筒型締結部材		
4	移動カム	4 a	異形	13	板ばね	13 a	中央
穴部				舌片部			
4 b	凸カム部			10 13 b	両端舌片部		
5	ばね			14	長尺板	15	カバ
6	固定カム	6 a	凹カ	16	水平回転部材	16 a	水平
ム部				ギヤ部			
7	開閉体ケース	7 a	筒状	17	モーター	18	ディ
部				スプレイ			
				19	半円ギヤ部	20	中間
				ギヤ			
				21	本体	21 a	ラッ
				20 ク部			
				22	増速ギヤ		

【図1】

【図2】

【図3】

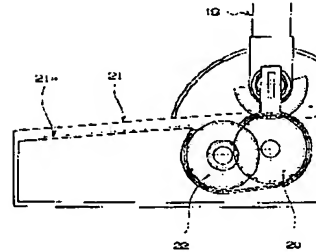
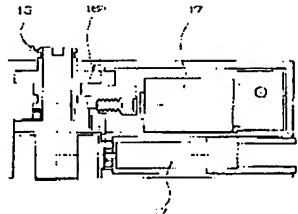
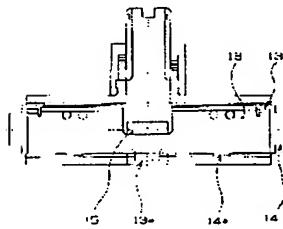
【図6】



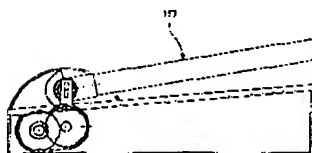
【図4】

【図5】

【図7】



【図8】



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TITLE: CYLINDRICAL HINGE

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INVENTOR-INFORMATION:

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APPL-NO: JP2001245121

APPL-DATE: August 13, 2001

INT-CL (IPC): F16C011/04, G06F001/16 , H04M001/02 , H05K005/03

ABSTRACT:

PROBLEM TO BE SOLVED: To provide a hinge used for opening/closing of a display or the like in a portable device, in which a harness can be inserted inside for achieving a smaller diameter, in which it can be rotated by a switch or remote control for changing the angles of the display by remote control, and in which the root of the display moves forward as it is opened, even if the angle opened is almost 180°.

SOLUTION: A shaft member is provided with a rotation-stopping function to an enclosing cylinder and a cam to generate clicks, and the hinge is composed of three elements of shaft, spring and cylinder for achieving a smaller radius. The hinge is cylindrical and hollow for the harness to be inserted, and the enclosing cylinder is used as a casing, so that the whole display can be small in weight. For remote control to the hinge, a motor is provided inside the

hinge, and a gear part is provided in an inner cylinder achieving a shaft function of the hinge, so that the inner cylinder is rotated. For forward movement of the display, a gear part is provided in a hinge outer cylinder supporting the root of the display, and a rack part is provided inside the body, so that they are engaged with each other via a step-up gear or the like. The hinge is thus moved, as the display is opened.

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